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THE FUTURE AS AN OBJECT OF RESEARCH

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1. INTRODUCTION

The theme of this discussion is the foreseeing or forecasting of changes in human affairs. Our interest is in the future, or at any rate the sort of picture of the future that we can draw for ourselves today. We shall not attempt to consider the future in its awesome totality, but shall limit the perspective to two sectors of particular interest alike to makers of public policy and to reflective citizens in the modern world: science and technology on the one hand, and our human and social environment upon the other.

Such a theme poses not simply a project, but a problem. It does so because it is far from clear to what extent and by what methods we can today draw a picture of tomorrow's world in these areas. And even if we can do so reasonably well for literally tomorrow's world—the prospect becomes increasingly clouded as we proceed beyond the morrow towards the era a generation hence, the world of the year 2000 at the dawn of the 21st century.

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2. THE FUTURE IS NOW IN FASHION

Since the early 1960's, the future has blossomed forth into a topic of increasingly widespread concern and interest. This may not seem surprising—as somebody has remarked, it is only natural that one should be interested in the future, since we're all going to spend the rest of our lives there. But it has not always been so—even quite recently a scientist who concerned himself with futuristic questions may well have found himself regarded by his colleagues as something of a renegade: a cross between a Nostradamus-like seer and a science-fiction writer. In recent years, however, the future has come into its own.

The most visible showing has been made by men of affairs who rub shoulders with academics. The pattern has been set by such books as Bertrand de Jouvenel's Art of Conjecture (original French edition, Monaco, 1964; English translation, New York, 1966), Dennis Gabor's Inventing the Future (London, 1964), Theodore J. Gordon's The Future (New York, 1965), and also articles by Daniel Bell in his and Irving Kristol's journal The Public Interest. These American publications have been matched by a spate of books and articles in French and German—with such themes as Fritz Baade's Der Wettlauf zum Jahre 2,000 (Oldenburg, 1960)—which we shall not trouble to detail here.*

Behind this essentially publicistic effort lay the less widely bruited work of what might be called The Advice Establishment: clusters of hard and soft scientists working on advisory boards, study groups, and information-gathering commissions: the idea-producers for the policy-makers of

* For a rounded picture of publications in the area see Annette Harrison, "Bibliography on Automation and Technological Change and Studies of the Future," RAND Corporation paper P-3365-2 (March 1967).

our society. I think here of the Commission for the Year 2000 (a study-group chaired by Daniel Bell working for the American Academy of Arts and Sciences), the studies conducted by Resources for the Future in Washington, D.C. and the work of the National Planning Association, the studies completed last year by the Automation Commission (the National Commission on Automation, Manpower, and Technological Progress), the study currently in progress in the Civic Affairs Department of the National Industrial Conference Board, and the work of the Futuribles group in France, among others. All of these groups alike have the same fundamental objective: to provide guidance about the future as background for policy formulation.

A number of serious journalists have been sufficiently impressed by this spate of future-oriented studies to take up the cause. One may mention here the excellent article on "The Future as a Way of Life" by Alvin Toffler in the summer, 1965, issue of Horizon magazine, as well as a feature article in TIME, which coined the term "the futurists" for those who have been prominent in establishing and promoting this area of research. There is Walter Cronkite's recently-launched television series on "The Twenty-First Century." The January, 1967, issue of Fortune magazine contains an article on the future by Max Ways in which he speaks of "the new style" in forecasting and planning. Indulging in the futures game himself, he ventures the prediction: "By 1977, this new way of dealing with the future will be recognized at home and abroad as a salient American characteristic."

A project is undergoing serious exploration of founding in the U.S.A. an Institute for the Future—an organizational center for future-oriented studies somewhat along the lines of such non-profit research institutions as the Institute for Research in the Behavioral Sciences at Stanford or The RAND Corporation. Such an organization already exists on a

very modest scale in Europe in the Institut für Zukunftsfragen in Vienna. A "World Future Society" was launched in Washington, D.C., in 1966 with a newsletter called The Futurist first issued in February, 1967.

This whole constellation of activities, in the aggregate massive in scope and diversified in approach—comprises what might be called The Futures Industry. The activities of this industry go on at an increasingly intensive pace in dozens of institutions in the U.S.A., and in many corners of the world.*

The key to this new attitude towards the future lies in the idea of planning. For "planning" is nowadays no longer an idea with pejorative connotations, somehow reminiscent of communism, but a concept whose key importance is recognized in virtually every department of modern affairs: in government, in education, in research, in industry, in labor affairs. The value of planning has been brought home to everyone by the problems posed for our society by the strains of the phenomena of economic fluctuations, of automation, of educational inequities, of urban congestion, of the pollution of air and water—all of which can be removed or relieved by the use of foresight, in the planning of preventive measures. The premium put on planning by the increasingly high price

*For a comprehensive survey of the area see Erich Jantsch, Technological Forecasting in Perspective (Paris, 1966; Working Document for the Organization for Economic Cooperation and Development), and the Abt Associates, Survey of the State of the Art: Social, Political, and Economic Models and Simulations (Cambridge, Mass., 1965; Report for the National Commission on Technology, Automation, and Economic Progress). The former of these documents, despite its title, does not restrict its range to strictly scientific and technological issues, but concerns itself also with their social implications. Moreover, it contains an extensive bibliography, and makes a comprehensive survey of organizations and institutes in Europe and the U.S.A. that concern themselves with forecasting in these fields.

that must—in the current context—be paid for by the traditional policy of meeting difficulties as they arise and "muddling through" has given a new-found respectability to future-oriented studies.*

3. THE PROBLEM OF PREDICTIVE METHODOLOGY

The issue of a specific methodology of prediction has largely been neglected by methodologists and philosophers of science, who have concerned themselves primarily with considerations relating to explanation. This procedure is justifiable as long as one believes that explanation and prediction are strict methodological counterparts. However, this belief is one that has in recent years been increasingly under attack, and there is good reason to reject it—especially so with respect to the social sciences.** Consequently, it behooves us to take a brief look at the predictive instruments that are available.

Basically three items of predictive methodology are at our disposal: the extrapolation of historical experience, the utilization of analytical models, and the use of experts as forecasters.

Little need be said about the first of these methods, the extrapolation of historical experience. Everyone is familiar with the essentials of this type of projection into the future of current trends and tendencies. Everyone is well aware both of the usefulness of this method, and also of its drastic limitations. These are particularly significant

* For an incisive description of the new attitude towards the future see Olaf Helmer, "New Developments in Early Forecasting of Public Problems: A New Intellectual Climate" (Santa Monica, 1967; RAND Corporation Research Paper P-3576).

** For a detailed discussion of the issues adverted to rather allusively in the present paragraph see O. Helmer and N. Rescher, "On the Epistemology of the Inexact Sciences" (Santa Monica, 1960; RAND Corporation publication R-353).

in the areas at issue in the present discussion. The rapid pace of scientific and technological change in our times (and consequently its social impact) is so great that the method of extrapolation can be said, almost on general principles, to be ineffective. And this is especially true in the case of scientific change, since innovation in this sphere involves, almost by definition, a sharp break with the consolidated experience of the past.

The standard method of prediction in most cases—ranging from astronomy to meteorology and economics—is the analytical model. Here we have to do with a description (given, in the most familiar cases by sets of differential equations) of the phenomenology of the processes representing the functioning of a system. In the presence of such descriptive machinery the process of prediction becomes simple: We feed in the requisite data regarding the present state of the system, grind the cranks of the analytical mechanism, and obtain results about its future state.

This sounds idyllic, but all is not so easy. The principal trouble, of course, is that no one has yet devised analytical models for the processes that are relevant in the present context of discussion. The processes of scientific innovation, technological invention and diffusion, and the unfolding of patterns of social change are lions still waiting to be tamed by analytical model-builders. As yet we know little enough about which parameters are to be used in describing these processes, let alone being able to interrelate these parameters in analytical models.

We arrive now at the third of the aforementioned predictive methods—those which involve the systematic use of experts. The rationale of this procedure must be considered at least briefly.

For a predictive understanding of the course of human affairs, the concept of "nascent causality" represents a key factor. A nascent cause is one whose efficacy is as

yet only beginning to make itself felt, so that its workings are subtle, and masked by a host of other, currently more prominent factors.* A nascent cause is not a trend, but a significant causative factor in a trend of the future. But how is such a factor to be identified prior to—or in the incipient stages of—its actual impact? This is one of the principal points for the rationalization of expertise. The expert is able to bring to bear his background information in a way that is not systematized in a predefined analytical model but involves informed judgment based on inarticulated data. He is thus able to base his assessment not only upon overt trends, but also upon underlying regularities and a general, informal appraisal of the phenomenology at issue.

Granted that the expert has the generalized understanding necessary to provide insight into "nascent causality," how is this information to be extracted from him? Here a wide spectrum of procedures opens up before us, including questionnaires and interviews, brainstorming sessions, Delphi techniques (iterated questionnaires with information feedback) and operational games which provide a focussed structure to intellectual interaction. The details of these procedures do not concern us here.** The point to be stressed from the angle of our considerations is that the systematic (and preferably structured) utilization of expert opinion and speculation is perhaps the principal and most promising forecasting tool in the technological-scientific-social domain with which we are concerned.

* See Michel Massenet, "Methods of Forecasting in the Social Sciences" in Three Papers Translated from the Original French for the Commission on the Year 2,000 (Brookline, Massachusetts, 1966; American Academy of Arts and Sciences).

** For further details regarding such procedures—and a more general justification of the predictive use of expert judgment—see O. Helmer and N. Rescher, The Epistemology of the Inexact Sciences (op. cit.).

4. SOME MAJOR DIFFICULTIES FOR PREDICTION

Among the considerations that indicate the need for more research on the problems of predictive methodology in the sphere of the human sciences is the existence of certain substantial (but readily identifiable) difficulties in this sphere. It is well worth while detailing a few of these.

(i) Feedback

Predictions in human affairs, once they become appropriately public, can readily stimulate a reaction. If, for example, some undesirable development is foretold, preventive measures to assure its nonrealization can be taken, thus falsifying (or at any rate suspending) the initial prediction. Or again, if some prominent scientist designates some problem as a significant focus of future research his declaration itself may serve as a stimulus, giving his prediction an element of self-fulfillment. This type of phenomenon is wellknown in connection with election forecasts, which can themselves generate a significant reaction from the electorate: the candidate whose victory is indicated may either gain added support (the "bandwagon effect") or his rival may do so (the "underdog effect"). Various methodological mechanisms exist by which difficulties of this type can in certain cases be accomodated.* But in general such reactivity to predictions creates special difficulties in the human sciences, and demands special attention in the context of future-oriented research.

(ii) Chance

In human affairs factors which are prima-facie so small in proportion as to be virtually negligible can become amplified to the point of making an enormous difference in the course of events. Such developments represent the intervention of "chance" not because they do not fit within

* See H. A. Simon, "Bandwagon and Underdog Effects" in Models of Man (New York, Wiley, 1953).

the general cause-and-effect matrix of events, but because their effects are disproportionately large when judged in the context of the way in which affairs usually proceed in this area of operation. Chance thus becomes the significant entry on the stage of highly improbable, and thus unpredictable, developments. A good example would be the assassination of a key political figure. Other illustrations of such "chance" events that have a major impact will doubtless leap to the reader's mind. It is clear, however, that various domains can differ sharply in the scope that they provide for chance developments to make a major impact: it is obviously larger in the area of scientific discovery than in the demographic sphere, and larger in the political area than in either of these. The element of chance is particularly significant for the study of predictive methodology, because chance sets limits to our capacity for specific prediction. To the extent that developments result from causes that come into operation through "chance," they are (almost by definition) impossible to predict.* One of the tasks of a methodology of prediction would be to determine the relative extent of the Spiegelraum of chance perturbations, and, moreover, to analyze the mechanisms through which "chance" developments can make an impact in various areas.

(iii) Fashions

In human affairs—and not only sartorial, but scientific, intellectual, cultural, and political as well—the role of fashion is highly significant. As a social as well as a rational animal, man tends to conform his activities to those of selected fellows, and of course the substance of these conformities alters over time.

*That is, though one can always make the generic prediction that this type of development is possible one could not have made the specific prediction that in the case at issue this possibility would be actualized.

We know a great deal about the generic mechanisms through which changes in fashion will become operative (the desire for novelty, the pull of the taste-maker, the urge to be au courant, etc.). But the specific content of future fashions is something much harder to foresee. We have little difficulty in substantiating the thesis that there will be such changes, and are well informed about the why—the causative factors—of these changes. But just what the new foci of emphasis will be is something about which we are, in most instances, pretty much in the dark. The systematic study of the formation of intellectual and social fashions would be yet another important task for the development of an adequate predictive organon for future-oriented studies.

(iv) Values

Many corners of man's environment, and virtually all facets of his actions reflect the fact that people make choices. These choices manifest their preferences which, in turn mirror their values. Man's technological and social environment in the future will thus in significant measure be the reflection of his future values. Yet not only is scientific and technical progress itself difficult to predict, but the issue of its implementation imposes yet another stratum of difficulty for such progress presents us with opportunities, but just how—and indeed whether—we capitalize upon these opportunities will depend upon what these values will be. The scientific study of values is a recent and still very underdeveloped discipline. The predictive instrumentalities for the study of value change are sadly lacking at present. Progress in this area is a requisite for significant advances in the study of the human environment of the future.

5. THE PROBLEM OF DATA

One very important consideration that cannot be overstressed in a discussion of predictive methodology relates to "the data" of the field. Prediction in the areas that have concerned us here—in the sphere of science and technology and in that of social phenomena—is an enterprise that is still in its infancy. (This is why great stress is to be placed in this sphere upon methodological considerations.) Now the point to be stressed in this connection is that here, as elsewhere, theory must march hand-in-hand with data, and cannot successfully develop until our grasp on the "facts of the matter" improves.

When one thinks of the current relative success in economic forecasting and the great progress that has been made in the U.S. over the years in this area, one must bear in mind also the great bodies of enormously elaborate data compiled by various information-gathering activities—above all the Bureau of Labor Statistics. Such fact-finding resources can and should be broadened into the areas with which this discussion has been concerned. Matching the President's annual Economic Report, there should each year be a Social Report, and a report on Science and Technology. If the data needed for such reportage are ever developed, one can confidently expect that in the wake of this the predictive instrumentalities in these domains will improve dramatically.

6. CONCLUSION

This discussion has concerned itself with the human ecology of the future—the question of our scientific, technological, human, and social environment at a substantial remove from the present. Neither the desirability nor the actuality of extensive researches in this sphere can at this time of day be regarded as genuinely open to question. But the scientific standard of such investigations

represents an issue that is still in significant measure far from settled. The level of craftsmanship of forecasts in this sphere will not be as high as it can and should be unless such efforts are infused by a high degree of substantive adequacy and methodological sophistication.) The main purpose of this discussion has been to urge the contention that progress towards this desideratum calls for two as yet only fragmentarily fulfilled requisites: explicit research on the methodological problems of forecasting in the "soft" sciences, and a substantial improvement upon the current means of gathering data in the relevant areas.